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## A STUDY OF IMAGINATIONS.

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To "see things" in the ever-changing outlines of summer clouds or among the flames and embers of a fire, has doubtless in all ages been to imaginative men a source of entertainment and delight. Much of the charm of this pastime comes no doubt from the commonly accompanying circumstance of leisure, and from the novelty of exercising an aspect of mind all too little used and given freedom. Another element in the interest of the habit, however, comes from the endless variation in the forms which different persons fancy from any given contour or in any simple presented shape. For the purposes of studying the reproductive imaginations of men and women, the psychologist might well desire to take the clouds into his control and bid them serve him; but they are far beyond him and will not for a moment stay.

To reproduce, then, under applicable and controllable conditions these familiar studies of human fancy, the following simple means have been adopted, and they constitute the complete apparatus, simple enough, of the investigation. Chance blots of ink, made by pressing gently with the finger a drop of common writing fluid between two squares of paper, furnished all the variety of outline imaginable. (More explicit suggestions for the manufacture and usefulness of these characters may be found in the *Psychological Review* for May, 1897, page 390; to this article interested readers are referred.) The bits of gummed paper 3 c. m. square bearing the blots, scarce any one of which resembled any other, were then attached to cards convenient for the hand and arranged in twelve sets of ten blots each, the members of each set being numbered consecutively from one to ten with Arabic and the sets themselves in Roman numerals. Thus the back of every blot-card bore a number by which it could be registered and identified. Figure 1 is a photograph in miniature of the whole series, the characters being numbered from above downward and the sets from left to right. Observation of the picture will show how great is the variety of design. The uncommonly great interest of the subjects in the research was largely due to this circumstance, and to secure the constant attentive

effort of the subject is often no easy matter, although sometimes this means half the research done.

The subjects were mostly students in the Harvard psychological laboratory, although professors and their wives and one Latin-school girl were among the rest. The range of ages was between eighteen and sixty-two and the average nearly thirty-five. The subjects were employed as was convenient, no selection of any sort being made, and hence they may be

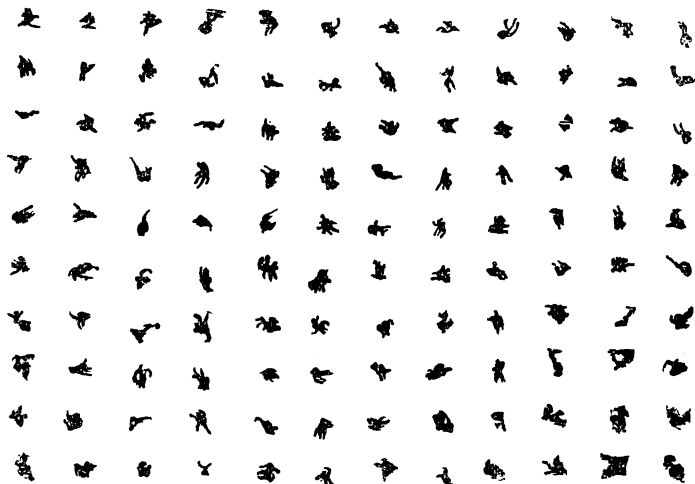


FIG. 1.

said, as far as any relation to imagination is concerned, to have been an average set from their particular social grade of culture and education. In the case of every subject some brief sketch of his or her early life was obtained as regards familiarity with various animal forms, and concerning fairy stories, mythology, and the like, and as regards possible habit of watching clouds and other natural forms as a pleasure of the imagination. It was expected that subjects raised on a farm, hunters, and artists would have a store of advantage over those of contrary habits. Among the subjects were two poets and two artists, and all of these were well toward the top in readiness and variety of response. One of these two poets made the shortest average of times, and the subject who had the longest average is a young man little fond of verse.

The experiments were conducted with the subjects always in normal condition as far as could be learned, and at an average hour of the day as regards fatigue and meals. Each was particularly instructed "to look at the blot-card always

right-side up, turning neither the card nor the head ; to try to employ the whole character if possible, not allowing it to separate into parts while being observed ; not to be too particular to get a perfectly fitting object in mind, but to tap at the moment of the consciousness of the first suggested image ; to react by a sharp tap as promptly as possible ; to report each concrete object suggested as concisely as possible, with any suggested general action of the same, and, especially, only such details as occurred before reaction by the tap." The method of the experiments was, then, simply thus : A set of blot-cards being arranged in order face down and a stop-watch in hand, after a warning, Ready ! one second previous, a blot was quickly placed before the subject at his or her proper visual distance. Upon the discovery of the blot's likeness to any object, the subject tapped and, the time being registered, a brief description of the suggested object was recorded opposite the number of the character ; and so on through the entire series of 120, or, more commonly, until decrease of interest or evident slowing of reaction indicated the beginning of fatigue (which was carefully inquired after and noted), when the experiment was promptly suspended for the time. None of the subjects had seen the blots before the time of the experiment.

As would be supposed after observing the different characters as represented in the illustration, most of the replies to the general question, What is it ? were various in the extreme. This variation is least in set number one, as the blots of that file were selected and placed together as the first set, that their relative easiness might compensate for the novelty of the experience and slowness of reaction in unprofessional subjects.

The figures in the accompanying table indicate in seconds averages of the times for the ten blots composing each set. In these results the interesting cases of apparent inhibition are included, it being practically impossible to discriminate such cases of exception from slow examples of associative imagination, and no cases of inhibition being long or frequent enough to essentially vitiate the average of any subject. These periods of inhibition have an interest in themselves, for although much like ordinary cases of amnesic aphasia, they differ from them in that here the blocking seems to be among the brain paths or currents representing objects instead of among those representing words, as is the common case. Perhaps for a minute or two the subject would sit staring at the blot, but wholly unable to see any resemblance in it to any object, and this wholly independent of any inherent oddity of the character, and of inattention. The real

SUB- JECT.	Approx. Age.	AVERAGE TIMES, IN SECONDS.												AV.
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
A.	23	5.4	4.6	4.3	9.0	4.3	7.6	6.8	8.2	6.8	14.8	8.5	7.8	7.3
B.	28	5.3	13.4	16.1	4.7	13.7	16.2	6.3	23.6	5.3	31.2	8.0	11.3	12.8
C.	21	6.3	15.0	14.2	8.4	14.1	27.5	15.5	12.5	12.4	8.4	8.1	8.6	12.6
D.	24	3.2	12.5	25.1	10.7	13.1	27.8	30.0	23.0	15.4	4.0	3.5	7.9	14.7
E.	22	5.3	4.0	9.6	9.5	10.2	12.4	19.5	9.6	7.3	12.0	11.8	8.9	10.0
F.	30	18.7	13.1	8.8	4.6	8.0	9.5	8.6	7.1	4.5	8.3	10.2	6.1	8.9
G.	27	6.3	23.3	9.8	6.2	18.6	9.4	10.2	31.7	11.5	19.4	11.9	17.6	14.6
H.	60	16.4	9.0	22.4	11.5	16.4	6.2	7.3	10.6	14.9	16.6	32.6	21.6	15.5
I.	30	25.3	30.3	25.3	17.6	5.4	11.8	21.3	14.0	37.1	18.8	19.6	14.0	20.0
J.	18	12.1	10.4	13.7	13.3	9.7	21.9	27.4	16.2	14.1	15.1	14.1	11.7	15.0
K.	29	2.3	6.7	6.1	4.0	6.3	8.9	8.8	10.7	7.5	13.8	14.6	14.7	8.7
L.	29	3.8	1.3	4.8	2.9	2.2	3.8	4.9	2.2	3.3	5.0	1.8	3.4	3.3
M.	62	1.9	3.2	8.2	2.5	2.4	2.5	2.4	1.8	2.1	1.9	1.4	1.6	2.7
N.	61	2.5	6.6	15.7	5.2	4.7	9.2	2.0	4.9	6.4	10.4	5.9	4.6	6.5
O.	39	6.5	4.7	2.1	3.0	5.9	3.3	5.3	5.9	6.7	7.0	3.3	8.2	5.2
P.	34	5.7	7.5	11.6	3.5	3.3	7.0	14.6	7.5	6.5	7.1	4.1	6.2	7.5

Grand Average, 10.3

nature of these inhibitions is a problem for further research to answer. If arising from confusion or indecision between two or more resembling objects, such confusion or indecision was in these cases wholly a sub-conscious process, appearing to the subject almost always merely as a cessation of "mental activity."

The often considerable number of vacant seconds which elapsed between the application of the stimulus and the reaction image, offers a striking illustration of the entire sub-consciousness of the processes of reproductive imagination, but including in these cases much more. Here was presented a blot of ink, perceived by the subject; the next thing in his consciousness was a name of some object resembling in some respect or many the stimulus, so that a complicated process necessarily intervened. Many ancient pigeon-holes of the brain must have been searched, and a comparison made with the contents of each, followed by a judgment of greater agreement in some one case, a choice thereof, and the calling-up and utterance of a name, which again became consciousness. And this often in a fraction of a second. Such, we may conjecture, is the general process, although the many attempts at introspection gave wholly negative results. Frequent inquiry was made as to how, in what form, the suggested object came into consciousness, and the most frequent reply was that a name, articulate, visual, or auditory, was the first of

the object experienced. Sometimes, then, it was once or twice said, the connotations of the object developed. In some cases aphasia occurred and a hazy likeness of the object coming hovered for a few seconds or less before the mind. Here is a problem for research.

Instruments of precision for measuring small periods of time were not needed in these experiments, but intervals of not over half a second appeared in several instances, such reactions being as fast as regular time-reactions with judgment or choice, and much more characteristic of the reacting subject than of the blots on which the reaction occurred. The longest time required, three minutes very nearly, was by the subject with next to the longest general time average also; the two next longest were by two students of decidedly "intellectual type." Neither age nor sex shows a distinct influence in these quantitative results; habits of living, on the other hand, are clearly recorded in the figures as confirmed by knowledge of the various subjects' mental modes and occupations. The intellectual type appears in the numbers with like corroborative evidence. From the grand average of all the subjects' times, about ten seconds, it is apparent that the reactions were slower than one might *a priori* estimate from a study of the blots. Facility developed noticeably in some cases. It is curious to observe that an equal number of subjects were above and below the quantitative average; also that the slowest and fastest were nearly an equal number of seconds from the mean time, which thus doubly appears to be a true average time of these 1920 reactions. As a comparative mental test, this mode of experiment would seem to be valuable, representing accurately the mental functions upon which wit and mental liveliness depend.

The qualitative portion of this research has more of interest than the quantitative, howbeit its results are not statable in exact terms nor expressible in figures. The qualitative side better, however, suggests the mysteries of association and of the imagination, deep in the nervous substance, which future psychologists may explain. Each subject, it will be remembered, was instructed to report the *first* object which the blot suggested to him in each of the 120 cases. A comparison of these object-images gives, therefore, curious and interesting results, and leads into mazes of scientific conjecture.

In the case of no blot did over 40 per centum of the subjects agree on any one suggested object. In several instances no two of the subjects were reminded of the same thing. These two extreme blots are reproduced in Figure 2, the right blot, numbered X.10, having given the 40 per centum of agreements, and the other, XII.7, being one of those upon

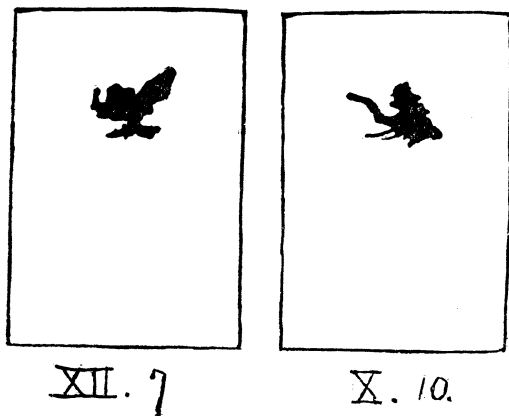


FIG. 2.

whose name no two agreed. Critical study of their outlines gives only one key to this great difference in difficulty, namely, that the one upon which there was agreement strongly suggests the familiar figure of a man (with upturned coat collar).

From out the 120 blots three have been chosen here as examples for a full report of the subjects' answers, the times being also given for greater completeness. These three characters are reproduced in Figure 3, and their respective descriptions follow :

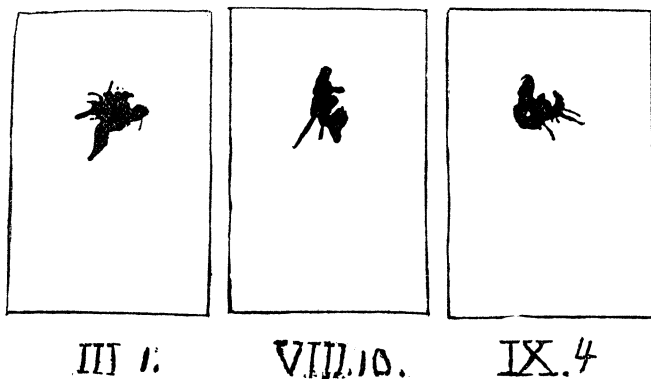


FIG. 3.

## III.1.

SUBJECT.	IMAGINED OBJECT.	Times. Seconds.
A.	Cabbage head.	3.
B.	Animal with mouth open.	46.
C.	Fairy on a cloud.	11.
D.	Woman, seated, basket of vegetables in her lap.	12.
E.	Top of an Indian's head, nose swollen.	4.
F.	Grotesque Indian's head.	22.
G.	Rabbit sitting hunched up.	16.
H.	Potted plant on the ground.	7.5
I.	Rooster sitting in a bunch of vegetables.	44.
J.	Grinning head of a beast.	3.
K.	Head of chicken with a top-knot.	2.
L.	Monstrous man's head.	1.5
M.	Flower.	2.5
N.	Cock's head, comb erect.	4.
O.	"Punch."	1.5
P.	Head of a woodcock.	6.

## VIII.4.

SUBJECT.	IMAGINED OBJECT.	Times. Seconds.
A.	Puritan scold about to be ducked.	9.
B.	Woman extending her hand.	2.
C.	Veiled woman on a stool; basket at her feet.	8.
D.	Woman on stilts.	16.7
E.	Mermaid enveloped in her hair.	6.
F.	Fore part of a grazing deer.	3.3
G.	Bear.	4.
H.	Man sitting on the limb of a tree.	3.8
I.	Monkey on a three-legged stool.	4.5
J.	Dog, tail very straight.	7.
K.	Man digging.	3.
L.	Girl in a high-chair throwing something into a basket.	1.
M.	Chimpanzee.	4.
N.	Old woman sitting on a tub on two legs; children at right.	1.3
O.	Person sitting on a person in a chair.	4.
P.	Woman sitting on a rock.	4.5

## IX.10.

SUBJECT.	IMAGINED OBJECT.	Times. Seconds.
A.	Demon on a beast.	4.
B.	Monster's head.	16.3
C.	Head of an Arab.	8.
D.	Running animal frisking.	2.
E.	Girl in a tall cap, seated.	4.
F.	Running pea-fowl, head on one side.	6.2
G.	Chimera.	11.5
H.	New style lady's bonnet.	70.
I.	Head of some one-eyed creature.	33.5
J.	Bat, flying.	47.8
K.	Two shrimps.	20.
L.	Child falling from a tub, falling from overturning stool.	2.
M.	Half of a sweet-pea bloom.	3.5
N.	Snake coiled around a stick.	3.
O.	Horseshoe-crab.	5.
P.	Human head (left part of blot only).	21.



Why one subject should see in a blot a "cabbage head" and the next an "animal with his mouth open," or why a professor should be reminded by a blot of "half a sweet pea blossom" and his wife of a "snake coiled round a stick," of course no one can at present pretend to explain. There is a temptation in such cases of association as these to call the results the choice of chance, but this means too little—or too much. It is clear that, as a general principle, the experience, and especially the early experience, of the subject has important influence. For example, study of the records shows that subject H., a purely domestic woman, is reminded most often of domestic objects; while subject O., who is an artist and student of mythology, sees in the blots many picturesque and fanciful things. The difference between the imaginations of the country and city bred is clear. Altogether there is evidence here that the laws of the reproductive imagination, still for the most part hid in the neural paths, are substantial laws, which may one day be found entirely out and reduced to words and to more or less of mathematical certainty of statement. Meanwhile it is something to establish, if possible, in a manner unmistakably demonstrable, the empirical conditions under which this "faculty" of mind performs its marvelous combinations and effects, for the imagination is one of the most interesting as well as most important phases of mentality.

In particular would it be interesting to know to what degree, if at all, the fixed ideas, delusions, and changed emotional conditions of what the Germans term conveniently *der Wahn*, influence and subvert the reproductive imaginations of the persons who are the victims of these obsessions and delusions, fixed into their mental natures deep as life. Perhaps an attempt to answer these interesting inquiries may form the substance of another research conducted with this same set of blots.